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EXAMINER

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

1. In an amendment dated, March 25th, 2009 the Applicants amended claims 1, 12, 19-20 and cancelled claims 2-6, 13-14, 16 and 21-22. Currently claims 1, 7-12 and 17-20 are pending.

Response to Arguments

2. Applicant's arguments filed March 25th, 2009 have been fully considered but as they are directed to new limitations and are believed to be answered by new rejection grounds which follow and are therefore moot.

Claim Objections

3. Claim 12 is objected to because of the following informalities:
- a. line 1 of page 5, states "a input video data" this is incorrect grammatically
 - b. line 4 of page 5, has the word "color" both underlined and strikethrough
 - c. line 8 of page 5, states "a input video data" this is incorrect grammatically.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 19 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yui (US 5,677,741) in view of D'Souza et al. (US 7,046,255).

With respect to claim 19, Yui discloses, a method of driving a display device (6 in fig. 1), comprising:

receiving image information (1 in fig. 4) including a gray scale value corresponding to a red, green, blue color (RGB input, 1 in fig. 1) by the display device (input data in fig. 6);

determining whether the gray scale level of the B color is greater than a predetermined reference gray scale level to begin reducing a color reproducibility in the display device (col. 2, lines 43-45; also note the color space comparisons made by the controller in col. 4, lines 39-67);

applying the received image information to the display device upon a determination the gray scale level of the B color is not greater than the predetermined reference gray scale level (col. 4, line 59 - col. 5, line 11); and

compensating the received image information by analyzing a gray scale level of the B color in the received image information (clear from figs. 6a-c2 that the B color level has been analyzed and compensated), and replacing a gray scale value of the gray scale level of the B color gray scale value in the received image information with a gray scale value of a gray scale immediately prior to the level (clipping is performed as shown in figs. 6a1-c2) retrieved from the lookup table in response to a determination that the gray scale level of the B color in the received image information is greater than the predetermined reference gray scale level (col. 4, line 57 – col. 5, line 11, details the operation when color reproducibility is a concern), and

outputting a received image information including a compensated gray scale value of the gray scale level of the B color (fig. 7).

Yui does not expressly disclose that the display is an LCD display.

D'Souza discloses a LCD display (col. 4, lines 60-63) driving method compensating image information (input R,G,B in fig. 2) and that retrieval of a R and G color value (506 values in fig. 5; specifically note the clipped B values and corresponding R and G values) are in response to the determination that the B color value of the displayable color is greater than the reference gray scale level (506 in fig. 5; fig. 2; note that the data for each color is supplied to all of the filters and lookup tables. Figure 5 demonstrates that all the colors are compensated based on each other's color reproducibility).

D'Souza and Yui are analogous because they are from the same field of endeavor namely, gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to use the image processing of Yui in an LCD taught by D'Souza.

The motivation for doing so would have been, to more accurately display colors, in a more cost effective way than using sRGB monitors (D'Souza; col. 2, lines 4-15).

With respect to claim 23, Yui and D'Souza disclose, the method of claim 19 (see above).

Yui further discloses, storing gray scale values of the 52nd to the 64th gray scale (col. 5, lines 1-5) level in the lookup table (3,9 in fig. 1).

Yui does not expressly disclose, mixing gray scale values of at least two of R, G, and B colors.

D'Souza discloses, mixing gray scale values of two colors (508 in fig. 5; specifically note the formerly solid blue (in 502) that now contains grayscale values for red in addition to the blue values, for certain blue colors.).

At the time of the invention it would have been obvious to one of ordinary skill in the art to mix gray scale values of at least two colors, as taught by D'Souza in the clipped gray scale device of Yui.

The motivation for doing so would have been, to more accurately display colors, in a more cost effective way than using sRGB monitors (D'Souza; col. 2, lines 4-15).

6. Claims 1 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yui (US 5,677,741) in view of Kimura et al. (US 6,008,786).

With respect to claim 1, Yui discloses, a display device (6 in fig. 1), comprising:
a display panel (6 in fig. 4),
a lookup table (9 in fig. 4) to store a gray scale value (output data in figs. 6a2-c2; col. 3, lines 58-65) corresponding to a predetermined grayscale level (input data in figs. 6a2-6c2; col. 3, lines 33-58) of a B color (B table; s11 in fig. 2b), wherein the predetermined gray scale level is a gray scale level immediately prior to a reference gray scale level to begin reducing a color reproducibility (figs. 6a2-c2; also note col. 5, lines 5-11), and the stored gray scale value is the maximum gray scale value corresponding to the maximum gray scale level displayable by the LCD panel for which

the color reproducibility of the B color is not reduced (col. 5, lines 5-11; col. 4, lines 26-33);

a data processing unit (3 and 7 in fig. 4) that analyzes a gray scale level of the B color in received image information (display profile and lookup table are retrieved to determine the display color space; col. 4, lines 33-35), replaces a gray scale value of the gray scale level of the B color in the received image information with the stored gray scale value corresponding to the predetermined gray scale level of the B color retrieved from the lookup table in response to a determination that the gray scale level of the B color in the received image information is greater than the reference gray scale and outputs a image information including a compensated gray scale value of the gray scale level of the B color (figs. 5a-c disclose the different determinations; col. 4, lines 39-67 disclose the compensation for each determination; s9-11 in fig. 2b); and

a data driving unit (5 in fig. 1) to receive the image information including the compensated gray scale value of the B color and to applying the compensated image information to the display panel (col. 2, lines 45-48).

Yui does not expressly disclose, that the display panel is a LCD panel with the requisite control circuitry.

Kimura discloses, a liquid crystal display (LCD) panel (1 in fig. 1), the LCD panel including a plurality of gate lines (note lines off of 5 in fig. 1) and a plurality of data lines (note lines off of 3 in fig. 1) crossing the plurality of gate lines, and a plurality of red (R), green (G), and blue (B) pixels arranged in a matrix pattern (col. 1, lines 47-48);

a gate driving unit to apply scan signals to the plurality of gate lines (5 in fig. 1).

Kimura and Yui are analogous art because they are both from the same field of endeavor namely gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the display panel of Yui with the LCD panel taught by Kimura.

The motivation for doing so would have been, low power consumption and fast response (Kimura; col. 1, lines 16-20).

With respect to claim 7, Yui and Kimura disclose, the device of claim 6 (see above).

Yui does not expressly disclose the use of 64 gray scale levels.

Kimura discloses, a lookup table that stores gray scale values each corresponding to one of 64 gray scale levels of a blue color (col. 4, lines 38-44; and col. 1, lines 52-56).

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the 256 level gray scale of Yui with the 64 level gray scale of Kimura for the benefit of cost.

With respect to claims 8 and 9, Yui and Kimura disclose, the device of claim 7 (see above).

While Yui discloses a 256 level gray scale instead of a 64 level gray scale, as shown above it would have been obvious to use a 64 level gray scale.

It is clear from figures 6A-2-6C-2 of Yui that once the input gray scale levels reach a certain level (based on the reproducibility of the device), that level is maintained until the maximum gray scale level.

With the conversion of Yui to a 64 level gray scale as noted in the rejection of claim 7 above the clipped portion in figure 6 would likely begin close to a 51st gray scale level. If the color reproducibility required that the gray scale be clipped at the 51st level then the disclosure of Yui could clearly accommodate that.

Furthermore, lacking a definite advantage of freezing grayscale values at the 51st level in the current invention, there does not appear to be any reason for specifically selecting the 51st level versus the 50th or 49th levels. This selection appears to be entirely predicated on at what level the color reproducibility begins to decrease. As Yui discloses adjusting the clipping of the gray scale based on the color reproducibility of the device, Yui is seen as sufficiently anticipating this limitation of claims 8 and 9.

With respect to claim 10, Yui and Kimura disclose, the device of claim 1 (see above).

Yui further discloses, wherein the lookup table stores gray scale values of blue, red and green colors (clear from figs. 6a2-c2).

7. Claims 11 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yui (US 5,677,741) in view of Kimura et al. (US 6,008,786) and further in view of D'Souza et al. (US 7,046,255).

With respect to claim 11, Yui and Kimura disclose, the device of claim 10 (see above).

Yui further discloses, storing gray scale values of the 52nd to the 64th gray scale (col. 5, lines 1-5) level in the lookup table (3,9 in fig. 1).

Neither Yui nor Kimura expressly disclose, mixing gray scale values of at least two of R, G, and B colors.

D'Souza discloses, mixing gray scale values of two colors (508 in fig. 5; specifically note the formerly solid blue (in 502) that now contains grayscale values for red in addition to the blue values, for certain blue colors.).

At the time of the invention it would have been obvious to one of ordinary skill in the art to mix gray scale values of at least two colors, as taught by D'Souza in the clipped gray scale device of Yui and Kimura.

The motivation for doing so would have been, to more accurately display colors, in a more cost effective way than using sRGB monitors (D'Souza; col. 2, lines 4-15).

With respect to claim 20, Yui and D'Souza disclose, the method of claim 19 (see above).

Yui further discloses, applying compensated image information to the LCD device (5 in fig. 4).

Neither D'Souza nor Yui expressly disclose, that the display panel comprises a plurality of data lines.

Kimura discloses, a liquid crystal display (LCD) panel (1 in fig. 1), the LCD panel including a plurality of gate lines (note lines off of 5 in fig. 1) and a plurality of data lines (note lines off of 3 in fig. 1) crossing the plurality of gate lines, and a plurality of red (R), green (G), and blue (B) pixels arranged in a matrix pattern (col. 1, lines 47-48) and applying compensated image information to the plurality of data lines (lines exiting X-driver; 3 in fig. 1).

Kimura, D'Souza and Yui are analogous art because they are both from the same field of endeavor namely gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the display panel of Yui and D'Souza with the LCD panel taught by Kimura.

The motivation for doing so would have been, low power consumption and fast response (Kimura; col. 1, lines 16-20).

8. Claims 12 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yui (US 5,677,741) in view of Beretta (US 5,416,890) and further in view of Kimura et al. (US 6,008,786).

With respect to claim 12, Yui discloses, a method for improving a color reproducibility (fig. 2) of a display device (6 in fig. 4), comprising:

detecting a grayscale value of B color a reference gray scale level of B color at which a color reproducibility of the LCD device begin to reduce (col. 4, lines 59-67; also see fig. 6a1-c2);

storing a gray scale value corresponding to a predetermined gray scale level of the B color (col. 5, lines 1-5) in a lookup table, wherein the predetermined gray scale level is a gray scale level immediately prior to the detected gray scale level, and the stored gray scale value is the maximum gray scale value corresponding to the maximum gray scale level displayable by the LCD device for which the color reproducibility of the B color is not reduced (col. 5, lines 5-11; col. 4, lines 26-33; figs.

5a-c disclose the different determinations; col. 4, lines 39-67 disclose the compensation for each determination; s9-11 in fig. 2b),

compensating an input video data by analyzing a gray scale level of the B color in the input video data (clear from figs. 6a-c2 that the displayable color has been analyzed and compensated), replacing a gray scale value of the gray scale level of the B color in the input video data with the stored gray scale value corresponding to the predetermined gray scale level of the B color (clipping if performed as shown in figs. 6a1-c2) retrieved from the lookup table in response to a determination that the gray scale level of the B color in the input video data is greater than the reference gray scale level, (col. 4, line 57 – col. 5, line 11, details the operation when color reproducibility is a concern), and outputting an input video data including a compensated gray scale value of the gray scale level of the B color (fig. 7);

applying the image information including the compensated gray scale value of the B color to the display device (6 in fig. 4).

Yui does not expressly disclose that the display device is a liquid crystal display or the manner in which the detecting step is performed.

Beretta discloses, an LCD (col. 13, lines 50-52) device increasing a gray scale value of a B color of the LCD device (col. 23, lines 30-46) and clipping the gray scale value when the color is not within the display's gamut (specifically col. 23, lines 42-44).

Yui and Beretta are analogous art because they are both from the same field of endeavor namely color reproducibility circuitry and methods.

At the time of the invention it would have been obvious to one of ordinary skill in the art to use the method of incrementing the color, taught by Beretta, when detecting the gray scale value when color reproducibility is reduced, as taught by Yui.

The motivation for doing so would have been to ensure the color is valid and providing a simple intuitive tool to the user (Beretta; col. 23, lines 40-55).

Neither Beretta nor Yui expressly disclose, that the compensated displayable color is applied to data lines of the LCD device.

Kimura discloses, a liquid crystal display (LCD) panel (1 in fig. 1), the LCD panel including a plurality of gate lines (note lines off of 5 in fig. 1) and a plurality of data lines (note lines off of 3 in fig. 1) that are applied image information (col. 1, lines 47-48).

Kimura, Beretta and Yui are analogous art because they are both from the same field of endeavor namely gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the display panel of Yui and Beretta with the LCD panel taught by Kimura.

The motivation for doing so would have been, low power consumption and fast response (Kimura; col. 1, lines 16-20).

With respect to claims 17 and 18, Yui, Beretta and Kimura disclose, the device of claim 12 (see above).

While Yui discloses a 256 level gray scale instead of a 64 level gray scale, as shown above it would have been obvious to use a 64 level gray scale.

It is clear from figures 6A-2-6C-2 of Yui that once the input gray scale levels reach a certain level (based on the reproducibility of the device), that level is maintained until the maximum gray scale level.

With the conversion of Yui to a 64 level gray scale the clipped portion in figure 6 would likely begin close to a 51st gray scale level. If the color reproducibility required that the gray scale be clipped at the 51st level then the disclosure of Yui could clearly accommodate that.

Furthermore, lacking a definite advantage of freezing grayscale values at the 51st level in the current invention, there does not appear to be any reason for specifically selecting the 51st level versus the 50th or 49th levels. This selection appears to be entirely predicated on at what level the color reproducibility begins to decrease. As Yui discloses adjusting the clipping of the gray scale based on the color reproducibility of the device, Yui is seen as sufficiently anticipating this limitation of claims 17 and 18.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM L. BODDIE whose telephone number is (571)272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Sumati Lefkowitz/

Supervisory Patent Examiner, Art Unit 2629

/W. L. B./

Examiner, Art Unit 2629

6/15/09